

AMENDMENTS TO THE CLAIMS

1. (previously presented) A method for continuously removing unreacted butene-1 and optionally other volatile components from a polymeric solution produced by liquid phase (co)polymerization of butene-1, the method comprising the steps of:
 - a) subjecting the polymeric solution to heating and mixing conditions such that a mixture is formed consisting essentially of: (1) a polybutene melt containing entrapped butene-1 and (2) supercritical gaseous butene-1; and
 - b) subjecting the mixture of step a) to a sequence of devolatilization steps operating at decreasing pressures and at temperatures comprised between 170 and 220°C.
2. (original) The method according to claim 1, wherein the other volatile components are comonomers, dimers, inert hydrocarbons, catalyst components and catalyst deactivators.
3. (original) The method according to claim 1, wherein the polymeric solution obtained by liquid phase (co)polymerization of butene-1 is a solution of polybutene-1 in butene-1 containing unreacted butene-1 in a percentage comprised between 65 and 90% by weight.
4. (original) The method according to claim 1, wherein the polymeric solution is fed to step a) at a temperature of 65-85°C.
5. (original) The method according to claim 1, wherein the polymeric solution is fed to step a) at a pressure of at least 22 bar.
6. (original) The method according to claim 5, wherein the polymeric solution is fed to step a) at a pressure in the range of from 25 to 80 bar.
7. (previously presented) The method according to claim 1, wherein the heating and mixing conditions of step a) are produced by flowing the solution of polybutene in butene-1 through a multi-tube heat exchanger having static mixing elements inserted inside each tube.
8. (original) The method according to claim 7, wherein said static mixing elements are mixing rods.
9. (previously presented) A method for continuously removing unreacted monomer and optionally other volatile components from a polymeric solution produced by a liquid-phase (co)polymerization of butene-1, the method comprising the steps of:
 - a₁) subjecting the polymeric solution to heating and mixing conditions so as to cause part

of the butene-1 to separate from the solution, thereby forming a product of step a₁;

a₂) subjecting the product of step a₁) to a further heating such that a two-phase mixture is formed consisting essentially of: (1) a polybutene melt containing entrapped butene-1 and (2) supercritical gaseous butene-1; and

b) subjecting the two-phase mixture of step a₂) to a sequence of devolatilization steps operating at decreasing pressures and at temperatures comprised between 170 and 220°C.

10. (original) The method according to claim 9, wherein step a₁) is carried out in a heat exchanger using a heating fluid at a temperature not higher than 146°C.

11. (previously presented) The method according to claim 9, wherein the product of step a₁) comprises a liquid and/or gaseous butene-1 and a polymeric solution having a concentration of PB-1 in butene-1 comprised between 40 and 70% by weight.

12. (previously presented) The method according to claim 9, wherein step a₂) is carried out in a heat exchanger using a high-temperature diathermic oil as a heating fluid.

13. (previously presented) The method according to claim 1, wherein the amount of butene-1 entrapped into the polybutene melt is less than 10% by weight.

14. (previously presented) The method according to claim 13, wherein the amount of butene-1 entrapped into the polybutene melt is less than 6% by weight.

15. (previously presented) The method according to claim 1, wherein step b) comprises devolatilization in a first volatilizer and a second volatilizer connected in series, the first volatilizer operating at a pressure higher than the atmospheric pressure, the second volatilizer operating under vacuum.

16. (original) The method according to claim 15, wherein the first volatilizer is operated at a temperature of from 170 to 220°C at a pressure of from 2 to 12 bar.

17. (previously presented) The method according to claim 15, wherein at an outlet of the first volatilizer the content of butene-1 in the polybutene melt is reduced to less than 3% by weight.

18. (previously presented) The method according to claim 15, wherein a polybutene melt coming from the first volatilizer is introduced into the second volatilizer operated at a temperature of from 170 to 220°C at a pressure of from 5 to 100 mbar.

19. (previously presented) The method according to claim 15, wherein at an outlet of the second volatilizer the content of butene-1 in the polybutene melt is reduced to less than 100 ppm.

20. (previously presented) The method according to claim 15, wherein the polybutene melt is compounded in a static mixer after devolatilization in the second volatilizer.
21. (previously presented) A process for obtaining butene-1 (co)polymers comprising the following steps:
 - a) (co)polymerizing butene-1 in liquid phase in the presence of a catalyst system based on a transition metal compound to obtain a solution of polybutene-1 in butene-1;
 - b) removing an amount of unreacted butene-1, optionally together with other volatile components, from said solution by
 - (I) subjecting the solution to heating and mixing conditions such that a mixture is formed consisting essentially of: (1) a polybutene melt containing entrapped butene-1 and (2) a supercritical gaseous butene-1;
 - (II) subjecting the mixture of step (I) to a sequence of devolatilization steps operating at decreasing pressures and at temperatures comprised between 170 and 220°C.
22. (previously presented) The method according to claim 9, wherein the amount of butene-1 entrapped into the polybutene melt is less than 10% by weight.
23. (previously presented) The method according to claim 22, wherein the amount of butene-1 entrapped into the polybutene melt is less than 6% by weight.
24. (previously presented) The method according to claim 9, wherein step b) comprises devolatilization in a first volatilizer and a second volatilizer connected in series, the first volatilizer operating at a pressure higher than the atmospheric pressure, the second volatilizer operating under vacuum.
25. (previously presented) The method according to claim 24, wherein the first volatilizer is operated at a temperature of from 170 to 220°C at a pressure of from 2 to 12 bar.
26. (previously presented) The method according to claim 24, wherein at an outlet of the first volatilizer the content of butene-1 in the polybutene melt is reduced to less than 3% by weight.

27. (previously presented) The method according to claim 24, wherein a polybutene melt coming from the first volatilizer is introduced into the second volatilizer operated at a temperature of from 170 to 220°C at a pressure of from 5 to 100 mbar.
28. (previously presented) The method according to claim 24, wherein at an outlet of the second volatilizer the content of butene-1 in the polybutene melt is reduced to less than 100 ppm.
29. (previously presented) The method according to claim 24, wherein the polybutene melt is compounded in a static mixer after devolatilization in the second volatilizer.